

# NATURAL RESOURCES CONSERVATION SERVICE

## CONSTRUCTION SPECIFICATION

### 606 - SUBSURFACE DRAIN

#### 1. SCOPE

This work shall consist of furnishing materials, excavating, backfilling, and installing subsurface drain. This work may include but is not limited to pipelines, fittings, bedding, drainfill, outlet pipes, outlet structures, animal guards, and related appurtenances. These items shall be installed as shown on the drawings and as specified herein.

Prior to commencing construction, public utilities shall be notified in accordance with N.Y.S. Industrial Code 753.

#### 2. MATERIALS

The materials required for the subsurface drain shall be as shown on the drawings or in Section 10. The materials specified shall meet the quality requirements as listed in the following latest revision of the appropriate ASTM specification.

#### ASTM Specification

#### PIPE

D-2241	PVC Pressure-Rated Pipe (SDR Series)
D-1785	PVC Plastic Pipe, Schedules 40, 80, and 120
D-2466	PVC Plastic Pipe Fittings, Schedule 40
D-2665	PVC Plastic Drain, Waste, and Vent Pipe and Fittings
D-3034	PVC (Type PSM) Sewer Pipe and Fittings
F-679	PVC Large Diameter Plastic Gravity Sewer Pipe and Fittings
D-2564	Solvent Cements for PVC Plastic Piping Systems
D-2104	PE Plastic Pipe, Schedule 40
D-2239	PE Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
D-2447	PE Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter
D-3035	PE Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
F-894	PE Large Diameter Profile Wall Sewer and Drain Pipe
F-405	Corrugated PE Tubing and Fittings
F-667	Large Diameter Corrugated PE Tubing and Fittings
A-760	Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
B-745B	Corrugated Aluminum Pipe for Sewers and Drains
C-76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
C-655	Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe
C-4	Clay Drain Tile
C-498	Perforated Clay Drain Tile

Note: When ASTM F405 corrugated polyethylene tubing and fittings are used, they shall be heavy duty.

When perforated pipe is required, perforations shall not exceed 3/16 inch in diameter for circular holes or shall not exceed 1/8 inch in width for slotted perforations unless

otherwise specified in Section 10.

### 3. EXCAVATION

All trench excavations over 5 feet shall be sloped or shored in accordance with OSHA part 1926 and N.Y.S. Industrial Code 23. When bracing or other supporting is required, the width of the excavation shall be adjusted to allow space for the shoring. The contractor shall furnish, place and subsequently remove such supporting installations as necessary to safeguard work and workers.

Unless otherwise specified, excavation for and installation of each subsurface drain shall begin at the outlet and progress upstream.

All excavations or trench excavations for the subsurface drain shall be constructed to the widths, depths, lines, grades, elevations and cross sections as shown on the drawings. Unless otherwise specified in Section 10, the minimum trench width shall be 18 inches.

### 4. BEDDING

In stable soils when bedding is specified, the conduit shall be firmly and uniformly bedded throughout its entire length with the bedding material shown on the drawings or as specified in Section 10 to the depths shown on the drawings. If no bedding is specified or bedding is to be trench excavated material, the trench bottom shall be scarified and grooved to provide good support under the pipe haunches.

When soil foundations are found to be unstable, a suitable foundation is to be provided by over excavation of the foundation then backfilling with a suitable compacted material to provide a firm uniform sub-base. A suitable foundation can be provided by spanning the unstable foundation area with a structural support system that will carry the bedding, piping and backfill loads anticipated and maintain the grades shown on the drawings.

### 5. PIPE AND STRUCTURE PLACEMENT

Pipe material shall be handled and installed according to manufacturer's recommendations. The subsurface drain, fittings, structures and outlets are to be placed to the lines, grades, and elevations shown on the drawings or as staked in the field. The placement of the conduit is not to be accomplished until the specified bedding is in place or the trench bottom is shaped to receive the pipe or structure, unless a drain plow is used for installation.

If bedding is not specified and Corrugated Polyethylene (PE) Tubing and Fittings are to be installed, the trench bottom shall be shaped to a semi-circle or 90° V-notch prior to pipe placement.

Upstream ends of all pipes shall be closed with suitable plugs.

### 6. CONNECTIONS

All pipe joints and connections of similar materials shall be made with manufactured fittings which are of the same material and are comparable in strength with the specified pipe materials. Dissimilar pipe connections shall be made with flexible quick connect couplings or other specified couplings. Pipe connections to fabricated structures are to be watertight joints unless otherwise specified or approved by the approving official or designated representative.

Lateral connections shall be made with manufactured junctions comparable in strength with the specified pipe unless otherwise specified.

## 7. BACKFILLING

Prior to backfilling, the pipe installation shall be inspected and approved for line, grade, depth, bedding, and pipe placement by the approving official or designated representative, unless a drain plow is used for installation. The backfill material shall be as shown on the drawings or as specified in Section 10. Backfill material shall contain no frozen soil, brush, roots, debris or other objectionable material.

After placement has been approved, initial backfilling (blinding) of the structure and pipe shall be accomplished with the specified backfill material to a thickness of 12 inches around any structure and to a thickness of 6 inches on each side and over the top of the pipe, being careful not to cause any displacement of the structure or pipe in line or grade.

The final backfilling of the trench shall be completed as soon after blinding as conditions permit being careful not to damage or displace the pipe with backfilling equipment or backfill material.

Backfill of pipe trench shall extend at least 6 inches above the finished ground surface and be well rounded over the trench, unless backfill has been compacted in layers during backfill operations.

Where pipe trenches cross roads, high traffic areas, or at other designated locations on the drawings, the backfill shall be placed and compacted in successive layers. The maximum lift thickness and compaction method shall be as specified in Section 10, or as shown on the drawings. These backfill provisions do not apply where the subsurface drain consists of flexible drain tubing installed with a drain plow.

## 8. OUTLETS

The outlet of the subsurface drain shall be a length of rigid pipe with at least two-thirds of its length embedded in the bank. The outlet pipe shall be equipped with a flap gate or other swing type animal guard, unless otherwise shown on the drawings, to protect the drainage system from rodents.

9. MEASUREMENT AND PAYMENT

Method 1

For items of work for which specific unit prices are established in the contract, the length of the subsurface drain will be measured to the nearest linear foot along the centerline of any outlet ditch and along the centerline of the subsurface drain trench including any laterals. Payment for the subsurface drain will be made at the contract unit price. Such payment will constitute full compensation for all labor, materials, equipment, tools, and other appurtenances necessary and incidental to the completion of the work, including supplying, installing, and backfilling any associated structures.

Method 2

For items of work for which specific lump sum prices are established in the contract, the quantity of subsurface drain will not be measured. Payment for the subsurface drain will be made at the contract lump sum price. Such payment will constitute full compensation for all labor, materials, equipment, tools, and other appurtenances necessary and incidental to the completion of the work, including supplying, installing, and backfilling any associated structures.

Compensation for any item of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 10.

10. ITEMS OF WORK AND ADDITIONAL CONDITIONS